

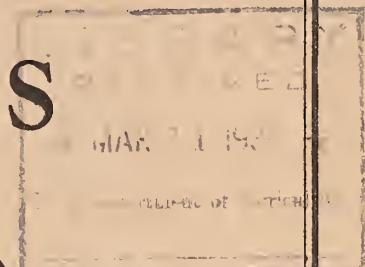
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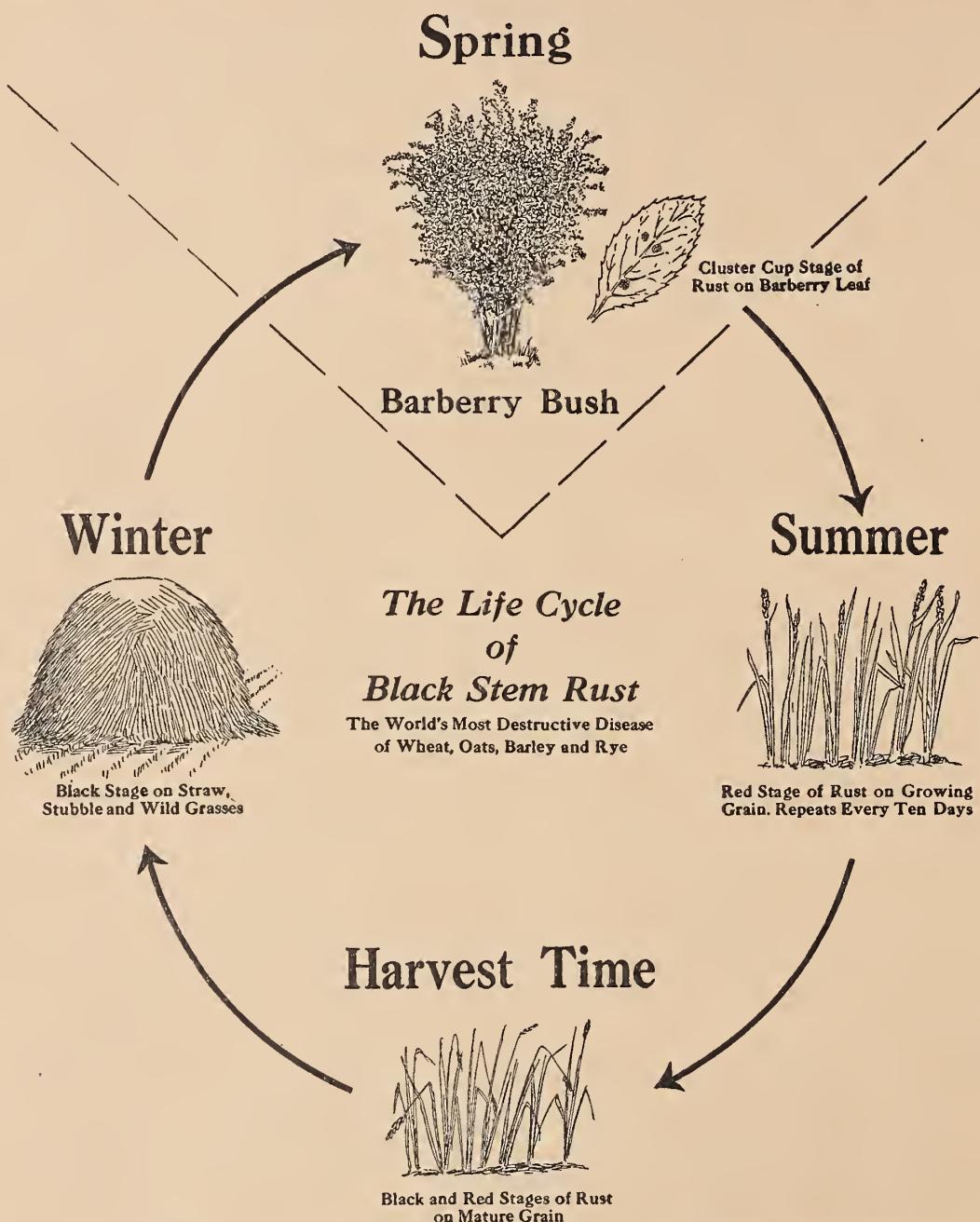
PROGRESS  
*of the*  
**Barberry Eradication  
Campaign**  
*in*  
**OHIO in 1929**



**Our Grain Crops Must Be Protected from Black Stem Rust**

**Barberry Eradication Pays**

# Remove the Barberry and Break the Rust Cycle



All Common Barberries act as starting points for Black Stem Rust early each spring. By destroying the barberry the early spring source of black stem rust is eliminated. The Common Barberry provides a means to bridge the gap between the black stage on grain in the fall and the red stage of the rust on grains and grasses the following spring.

BOOST BARBERRY ERADICATION—A PRACTICAL RUST CONTROL MEASURE

# PROGRESS OF THE BARBERRY-ERADICATION CAMPAIGN

IN OHIO, 1929

By John W. Baringer, Formerly Pathologist,<sup>1/</sup>

Office of Cereal Crops and Diseases,<sup>2/</sup> Bureau of Plant Industry,

United States Department of Agriculture

## Introduction

Black stem rust generally is conceded to be the most destructive of all the diseases that attack wheat. Stem rust also constitutes a limiting factor in the production of oats, barley, and rye. The annual losses to farmers of the United States due to this cause amount to millions of bushels of small grain. The fungus that causes this disease not only lives for a time, each season, on grain plants or many of the grasses, but for a certain period each year in Ohio it must live on common or other susceptible barberry bushes. Experience has shown repeatedly and definitely that the enormous losses from this source have been much reduced both locally and generally over the spring-wheat area by the elimination of millions of common barberry bushes in the upper Mississippi Valley. Evidence indicates that the losses from this fungous disease may be further reduced by the same means. Ohio is one of 13 States in which a determined effort is now being made to kill all common barberry bushes.

## Organization

All agricultural agencies in Ohio are cooperating with the Office of Barberry Eradication of the Bureau of Plant Industry, United States Department of Agriculture, at Washington, D. C., and the Conference for the Prevention of Grain Rust at Minneapolis, Minn., in a campaign to rid Ohio of this undesirable intruder in plant society.

Headquarters for the campaign in Ohio are now located at the Department of Botany, Ohio State University, Columbus. A State Leader, employed by the United States Department of Agriculture, is in charge of the campaign program. A number of temporary field agents are employed each summer to assist in making surveys for barberry bushes.

## Field Personnel

Temporary field agents are selected on the basis of maturity, farm experience, general or specific training for the task at hand, and past experience on this or similar work.

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<sup>1/</sup> Formerly State Leader in Ohio.

<sup>2/</sup> From the beginning of the campaign in 1918 until January 1, 1930, barberry eradication was a project of the Office of Cereal Crops and Diseases, of the Bureau of Plant Industry. On January 1, 1930, the Office of Barberry Eradication was established as a separate unit of the Bureau.

### Financing

The barberry-eradication campaign in Ohio is supported chiefly by funds supplied by the United States Department of Agriculture. The Federal Government has appropriated \$32,000 annually for the work in Ohio for the past seven years. This money has been used to bear overhead costs, to pay salaries and subsistence of field men, and provide transportation facilities.

The Ohio Legislature has voted a cash appropriation for this work for the past eight years. This has constituted an annual average contribution of approximately \$5,000. This has been spent in the purchase of quantities of chemicals for use in killing barberries and for the payment of salaries and expenses of inspectors of the Ohio Division of Agriculture.

Indirect and more or less intangible assistance of great value has been given by other cooperating agencies in the form of office and storage space and printed and illustrative material, besides the personal services of members of the Extension staff of the State College of Agriculture.

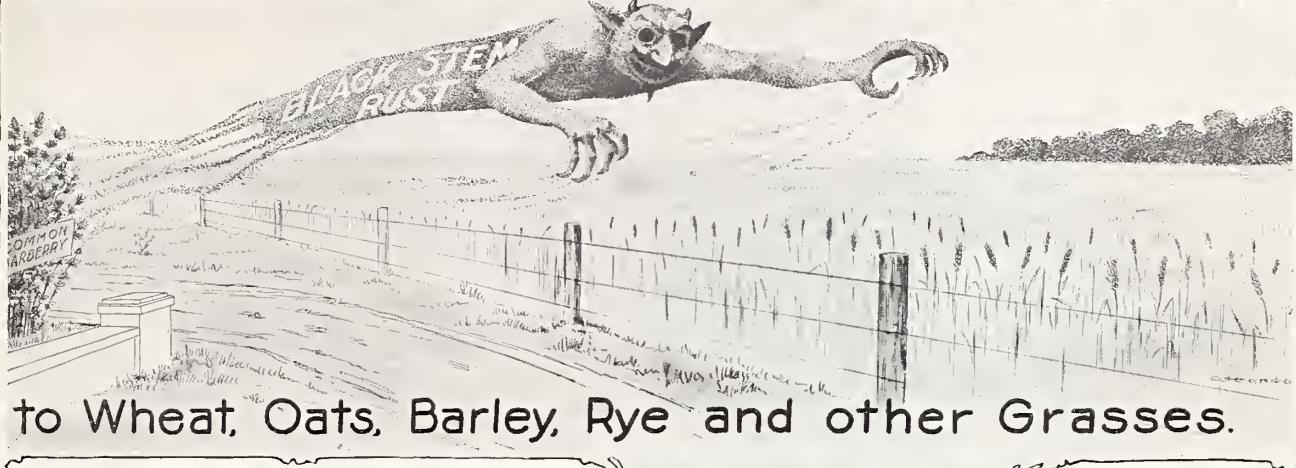
### Barberries and Stem Rust in Ohio

The damage to Ohio small grains due to black stem rust is ordinarily restricted to localized areas, depending upon the proximity of common barberry bushes. If weather conditions during the growing season favor rust spread, these areas within the State may be numerous. However, the severity and extent of such local outbreaks depend on moisture and temperature conditions, the stage of development of the grain at the time of initial and subsequent infection, the local topography, and the nearness of susceptible grasses. Several instances have been recorded in which individual farmers or communities of farmers have abandoned attempts to raise wheat on account of the annual recurrence of black stem rust. Each year local epidemics of stem rust on grain are discovered, and later the barberries that started the trouble are found in the vicinity. In some cases immediate complete eradication of the barberries concerned has not been effected, because of the impossibility of finding all of them at a given time. In other cases the offending bushes have been stamped out of existence and local annual rust losses have been reduced. A substantial reduction in local losses from this source has invariably followed the removal of large numbers of barberry bushes.

### All Known Methods of Rust Control Must Be Employed

While barberry eradication is of first importance, there are several known methods for reducing losses due to black stem rust. Early sowing of grain, proper preparation of the seed bed, avoidance of low, poorly drained land, proper use of fertilizers, in fact, anything that promotes early ripening of the grain, will help to reduce the danger from rust.

# BLACK STEM RUST SPREADS FROM COMMON BARBERRIES



to Wheat, Oats, Barley, Rye and other Grasses.

Black Stem Rust as it appears on the leaves of the Common Barberry



Enlarged single leaf



Plump healthy grain



Shriveled rusted grain

## DANGEROUS NEIGHBORS



Common Barberry Bushes growing near grain fields



Common Barberry is  
harmful, destroy



Report Common Bar-  
berry bushes you may  
find to your State  
Leader of Barberry  
Eradication.

Japanese Barberry is harmless,  
do not destroy



Certain varieties of wheat, oats, and barley that are more resistant than others have been produced by plant breeders. Wherever these varieties meet the requirements of a given region and are found desirable from the standpoint of yield, milling quality, and resistance to other diseases, they should be substituted for the less satisfactory varieties.

New Strains of Destructive Black Stem Rust Develop  
on the Common Barberry

The production of rust-resistant varieties of grains probably will be much more successful, however, when all common barberry bushes have been eradicated. The reason for this is shown in the recent important discoveries made in the Canadian Rust Research Laboratories at Winnipeg, Manitoba, and by E. C. Stakman and his co-workers at the University of Minnesota. Both of these groups, conducting independent research, proved that entirely new strains of the destructive black stem rust are produced if two different forms of the rust crossbreed on the barberry leaves. The certainty that new forms of the dangerous disease may appear suddenly makes the eradication of the common barberry all the more imperative, since it is on the barberry alone that this crossing can occur in nature. The new and apparently resistant varieties of grains are not safe with barberries near. If for no other reason than to protect the new kinds of super wheat which are now in the process of being developed, all common barberry bushes should be destroyed.

Summary of Campaign Progress, 1918 - 1928

In 1918 considerable effort was made to obtain information pertaining to the spread of stem rust from common barberry bushes in various agricultural communities of Ohio. Eradication of barberries was not advocated until the evidence against them became thoroughly established.

The following year the major effort was directed toward the survey of cities and towns and the eradication of barberries found therein. This coverage was of a preliminary nature; that is, an attempt was made to push the survey as rapidly as possible with the hope of eliminating large numbers of barberries in a short time. Incidentally, it was at first supposed that probably 90 per cent of the barberries in existence would be found in urban localities, but more recent experience has proved that the supposition was incorrect.

A systematic farm-to-farm survey, which is now known as the first survey, was started in western Ohio in 1920 and has been continued uninterruptedly to and including the present year. Progress of the survey has been from west to east within the State, county by county. During the first five years of the systematic rural survey farmyards, orchards, gardens, and barnyards were inspected for the presence of barberry bushes. If no fruiting bushes were found no search was made of near-by waste lands or woodlots. Common barberries are not native to the United States, and their presence in woodlands usually is attributed to the scattering of seeds of cultivated specimens by birds, streams, and other means.

However, a change in the method of inspection was found to be necessary. Many barberries were located in woodlands in communities where no fruiting barberries were present on farmsteads at the time of inspection. It was learned that some people had planted barberry bushes many years ago and had destroyed them at some later date on account of resulting damage to grain or for other reasons.

In 1924 a test systematic inspection, which might be called a second survey, was made in two counties where the first survey had been completed. The purpose of the test was to determine the efficiency of the first survey in the matter of barberry locations found or missed. Results of this test also showed a need for a change of inspection methods.

Accordingly, in 1925, the survey method adopted embraced the coverage on foot of all woodlands, fence rows, stream banks, and waste lands in addition to the inspection of the immediate surroundings of the farm house. This method has been in general favor since its adoption. With few exceptions it is now used on all systematic surveys to the exclusion of other methods.

Considerable checking of properties where barberries were once found was done during the period 1921 to 1925, inclusive. This activity has been called resurvey. The purpose of a resurvey is to determine whether or not roots that may have been left in the ground at digging time have since produced sprouts, whether bushes treated with chemicals have been killed, whether seeds that may have been on the ground have produced seedlings, and whether some bushes on the property may have been overlooked on former inspections.

Salt and kerosene have been used as killing agents wherever possible since 1922; digging and pulling were the eradication methods first employed. It is still necessary to dig barberries on well-kept lawns where the detrimental effect of chemicals on adjacent valuable vegetation must be avoided.

Observations have been made on the natural behavior of barberries from seed germination to maturity of the bushes and on the growth of barberries in competition with various types of native vegetation. Many of the conclusions have been substantiated or disproved by carefully arranged experiments.

The necessity of providing the public with adequate information concerning all phases of the barberry-eradication campaign has been recognized from the beginning, and steps have been taken to fulfill this need. Many of the best known extension methods have been used from time to time, and new methods of distributing information are frequently employed.

From 1918 to 1928, inclusive, approximately 404,583 barberry bushes and 1,815,848 barberry seedlings were found in Ohio on all surveys.

#### Summary of Campaign Progress, 1929

Campaign activities for 1929 might be conveniently divided into seven phases: (1) The completion of first survey; (2) the continuation of second survey; (3) resurvey activities; (4) investigation of barberry location leads; (5) continuation of seedling experiments; (6) observation of grain rust behavior; and (7) the furtherance of the educational and publicity program.



FLOWERS  
(yellow)

BERRIES  
(bright red)

## Where Barberry Bushes Grow



“IN DOORYARDS”



BIRDS CARRY BARBERRY SEEDS SEVERAL  
MILES, DROPPING THEM AMONG ROCKS  
AND IN OUT-OF-THE-WAY PLACES



“IN WOODLOTS”



“ON ROCKY HILLSIDES”



“AS HEDGE FENCES”

Barberries spread by birds



“UNDER OTHER”  
SHRUBS AND TREES





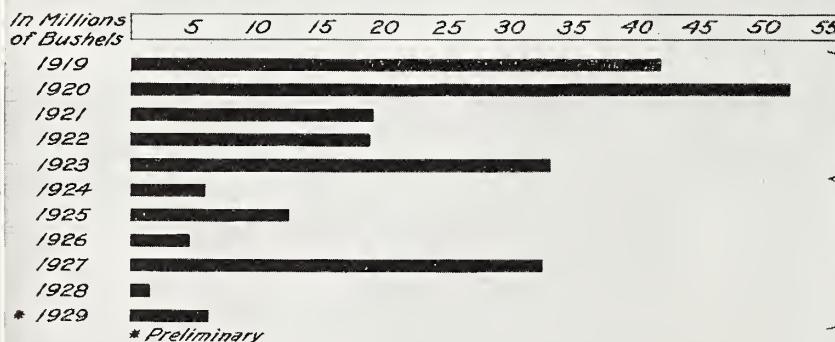
*Salting a bush*



*Sprouts from a dug bush*

## Common Salt Kills Barberry Bushes and Prevents Sprouting

### Wheat Losses in Barberry Eradication Area, 1919-1929



The average annual loss for the first five year period, 1919 to 1923, was approximately 33,000,000 bushels.

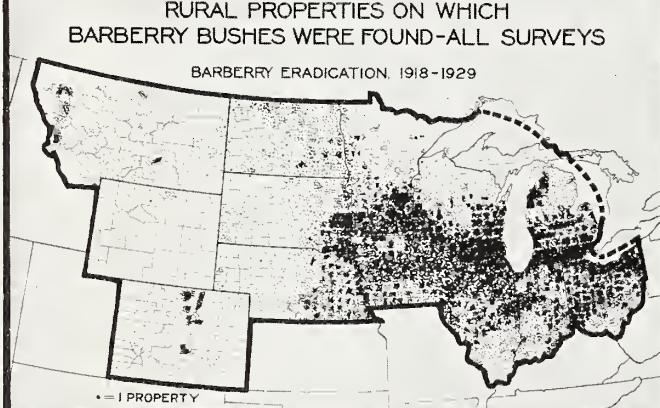
The average annual loss for the next six year period, 1924 to 1929, was approximately 10,500,000 bushels.

The losses to small grain crops caused by black stem rust have been reduced since the beginning of the barberry eradication campaign in 1918. The breeding of rust-resistant varieties, the use of early maturing varieties, and the sowing of crops early, have aided barberry eradication in this reduction.

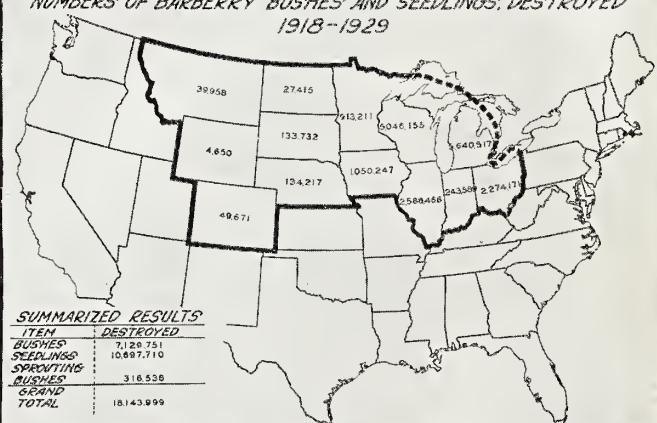
## “BARBERRY ERADICATION PAYS”

### RURAL PROPERTIES ON WHICH BARBERRY BUSHES WERE FOUND-ALL SURVEYS

BARBERRY ERADICATION, 1918-1929



### NUMBERS OF BARBERRY BUSHES AND SEEDLINGS, DESTROYED 1918-1929



The coverage of 25 per cent of Ashtabula County by first survey in the latter part of June, in July, and in the first few days in August marked the completion of the first survey of the entire State. The actual scouting operations were just as difficult as, or worse than, had been anticipated for the remainder of Ashtabula County. Much of the territory is covered by almost impenetrable woodlands, thickets, and marshes. The under drainage is very poor, and the mosquitoes are a real problem. The finding of escaped barberry bushes well scattered throughout the seven townships covered necessitated constant and careful observations. Approximately 957 man days were required to complete the work in Ashtabula County in 1929. Thirteen hundred and sixty-eight barberry bushes and 11,820 seedlings were found and destroyed on 56 properties. Several tons of salt were used in their destruction.

In Preble County a combination second survey and resurvey was in progress in August and September. Two townships had been covered by second survey in 1928, and the remaining ten townships were finished this year. On second survey 204 barberry bushes and 469 seedlings were found on 28 properties where barberries never before had been recorded. On resurvey in Preble County, 726 sprouting bushes and 269 seedlings were found on 11 properties. The work accomplished in Preble County required approximately 349 man days. The intensive scouting method was used on second survey.

In Montgomery County second survey and resurvey were pushed forward in April, May, and June by the Ohio Department of Agriculture and again in September and October by the Federal Government. Almost seven townships in the northwestern part of the county have been finished in this way. Approximately 531 man days were required to cover these townships. Up to this time the field agents have found on the second survey in Montgomery County 413 barberry bushes and 7,192 seedlings on 192 properties. During the resurvey activities in Montgomery County this year 68 sprouting bushes and 50 seedlings were found on 43 properties. The job of checking more than a thousand old records of barberry locations in Dayton, the county seat of Montgomery County, is proving a difficult task.

Besides the resurvey mentioned above, which was carried on in conjunction with second survey, some resurvey was done in Ashland, Butler, Greene, Franklin, Lorain, Trumbull, and Warren Counties.

Two men spent almost two months investigating information which had come to headquarters from various sources in the past few years, concerning the location of common barberries in various parts of the State. Eighty places were visited for this purpose. As might be expected, many of the leads were fruitless, but many were good.

Data were taken on some experiments started in 1926 and on others begun in 1928 pertaining to the behavior of barberry seedlings under various natural and artificial environments. Plans were made to further these experiments.

As in former years, considerable attention was devoted to observation on the time of occurrence and prevalence of stem rust on barberries and on grain in widely separated parts of the State, and to the collection of rust materials for further detailed study.

Educational and publicity activities were continued in 1929. In the winter, packets of study materials were sent to all teachers of sixth grades in 57 counties. Class materials also were supplied to all high schools in the State.

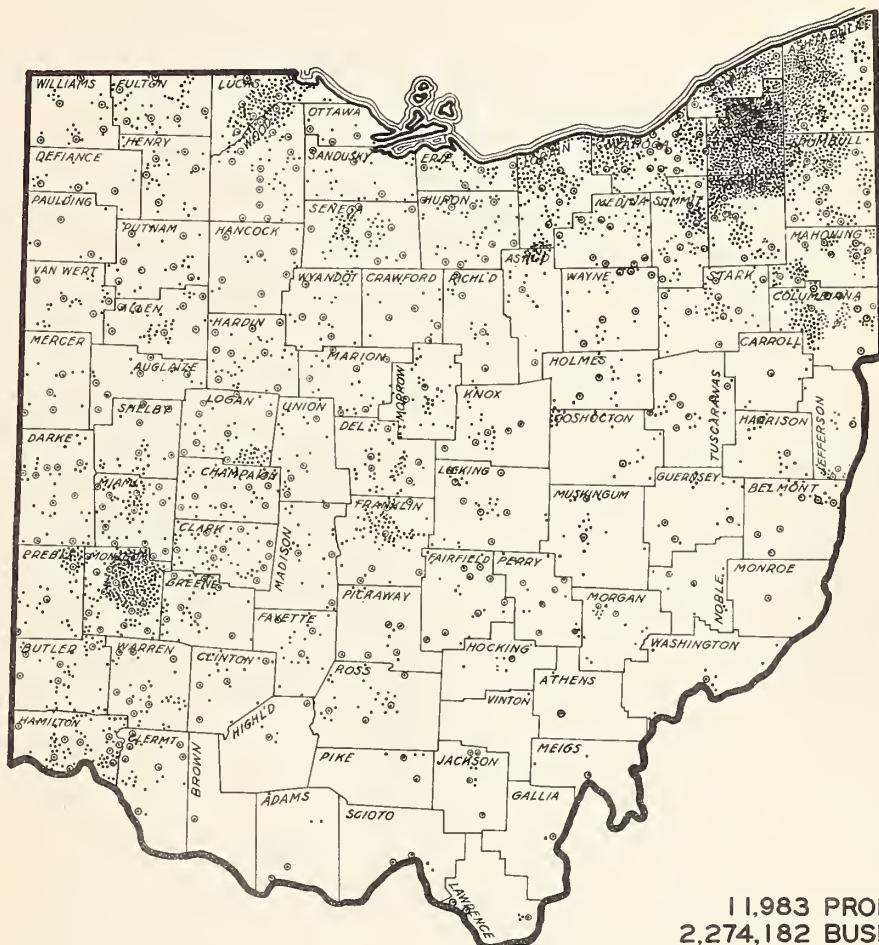
Circular letters were mailed in the summer to all farmers living within the townships being covered by first or second survey. As usual, effectual use was made of newspapers. Special mailing lists of leading farmers, bankers, grain dealers, millers, postmasters, railway express agents, etc., were used to advantage. Fairs, window displays, and other demonstrations had their place in the program. All this, in addition to thousands of personal contacts made by the field agents, served to keep barberry eradication before the public in 1929.

#### Plans for the Future

For 1930 the furtherance of second survey in the remainder of Montgomery County, and in two of three counties adjacent thereto, is planned. The checking of information voluntarily supplied by interested individuals concerning the location of barberries will receive attention. Some work probably will be done in keeping under control known areas of escaped barberries. The experiments now in progress will be promoted and rust investigations will be continued. Educational programs with schools and general publicity will continue as important activities.

# PROPERTIES HAVING BARBERRY BUSHES 1918-1929

OHIO

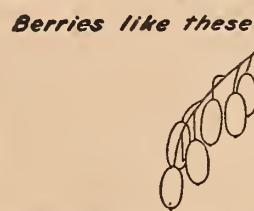
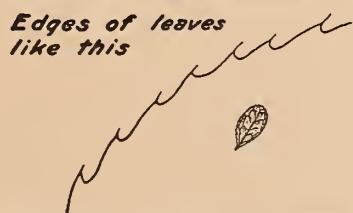


- FARMS HAVING BARBERRY BUSHES
- TOWNS HAVING BARBERRY BUSHES



# Common Barberry Spreads Black Stem Rust

When you find  
a spiny bush  
with-



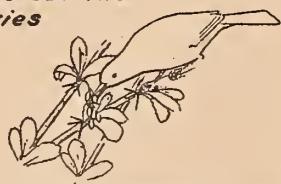
It is a  
**Common Barberry**  
and should be  
reported at once

## Know Common Barberry

## Look For It!

Spread of  
Barberries by  
birds

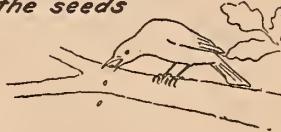
Birds eat the  
berries



Carry them to their  
roosting places



Where they cough  
up the seeds



From which seedling  
bushes grow



They in time  
bear fruit which  
is again carried  
farther on

## Look For and Report All Common Barberry Bushes

To the State Leader of Barberry Eradication, in care of your State Department of Agriculture or your State Agricultural College.

# Common Barberry Bushes

*spread*

## Black Stem Rust

*to*

WHEAT, OATS,  
BARLEY, RYE,  
*and Many Wild*  
Grasses

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